



# Navigating Stock Price Crashes

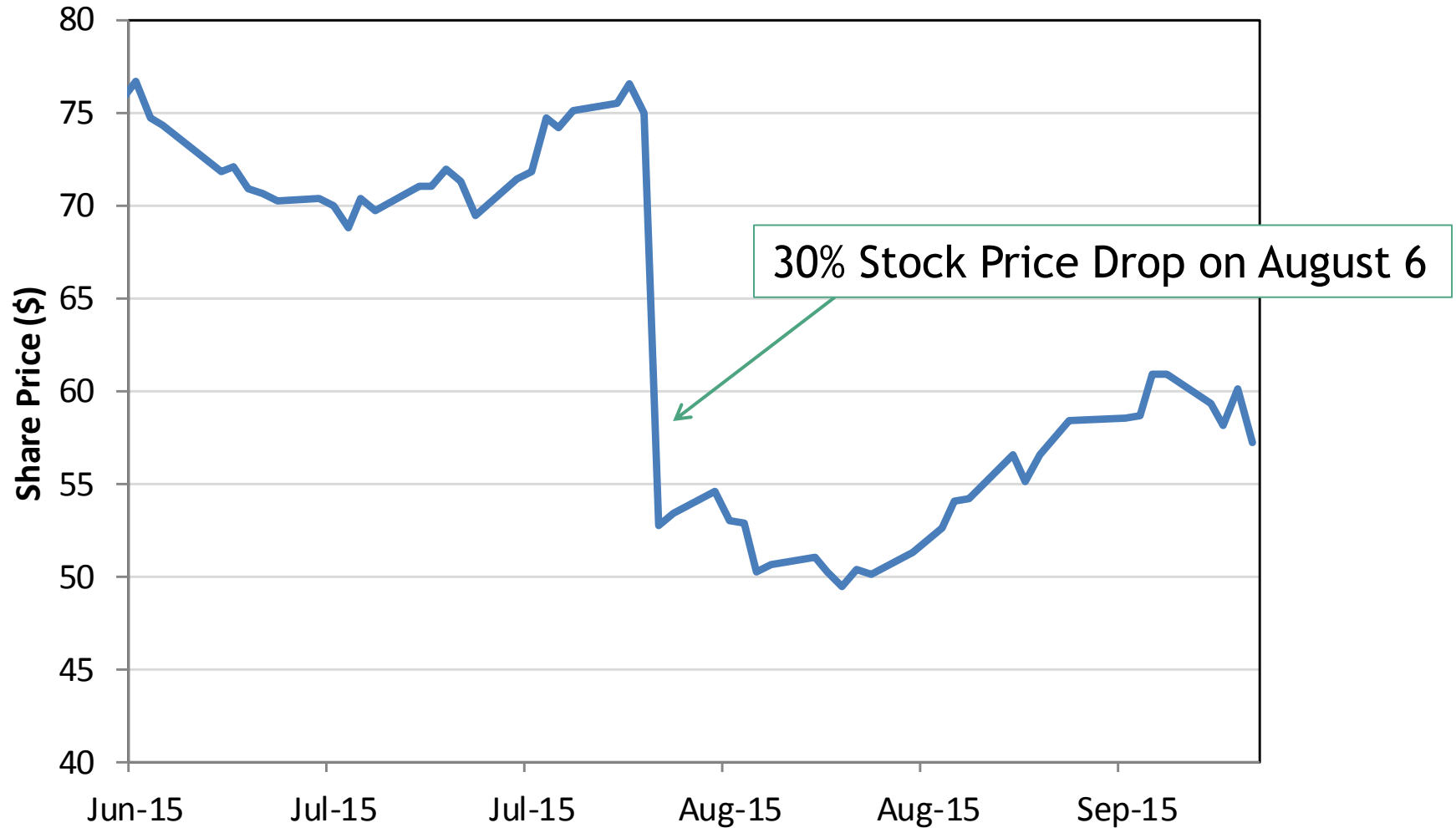
**By Steven Rossi**  
**RS Investments**

For

AAll Silicon Valley Chapter Meeting  
February 13, 2016

# GMCR: A Recent Stock Price Crash

## Keurig Green Mountain, Inc. (GMCR)



# What Happened at GMCR?

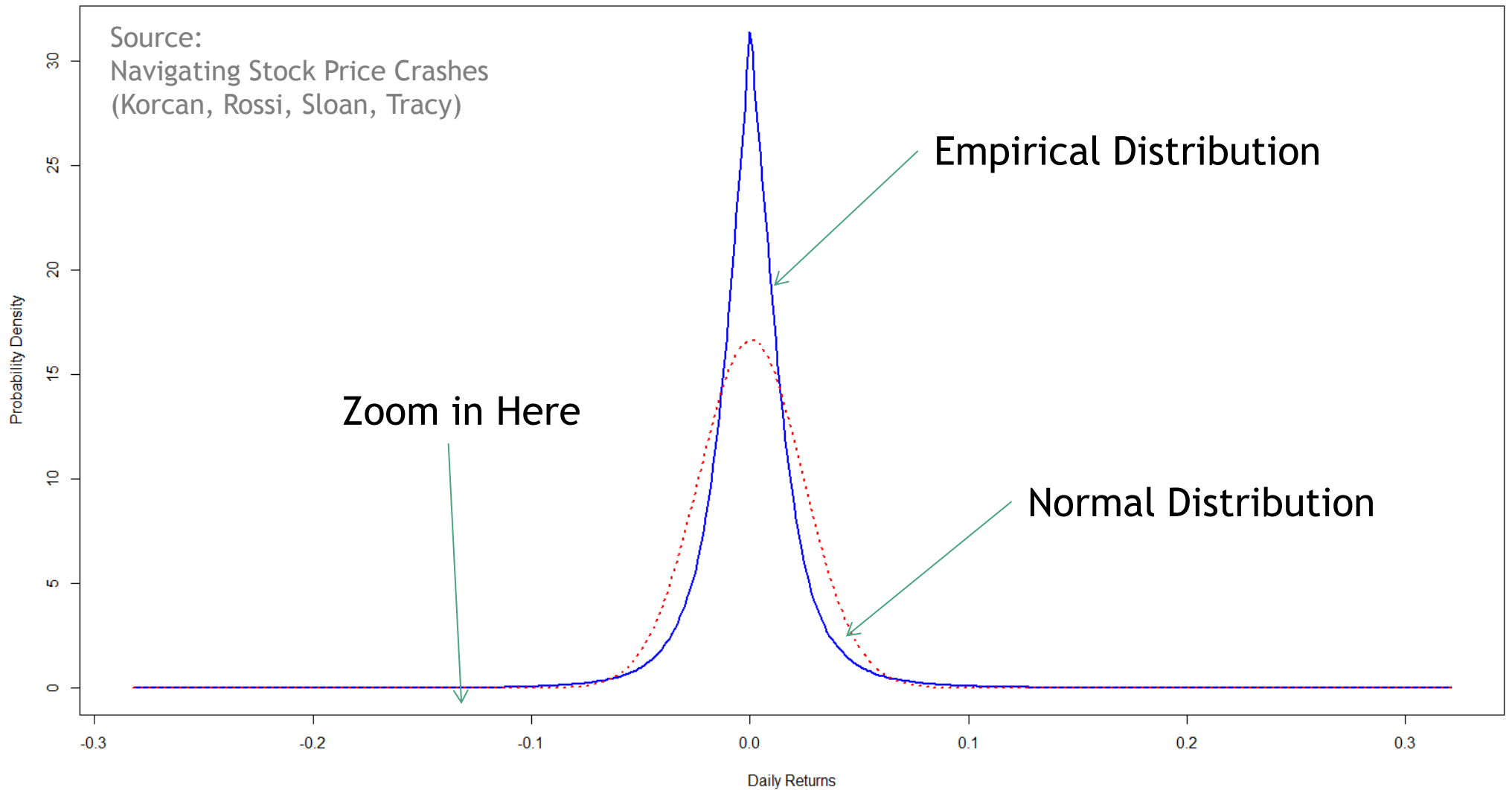
BUSINESS  
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by Akin Oyedele, August 5, 2015 4:56 PM

## KEURIG CRASHES

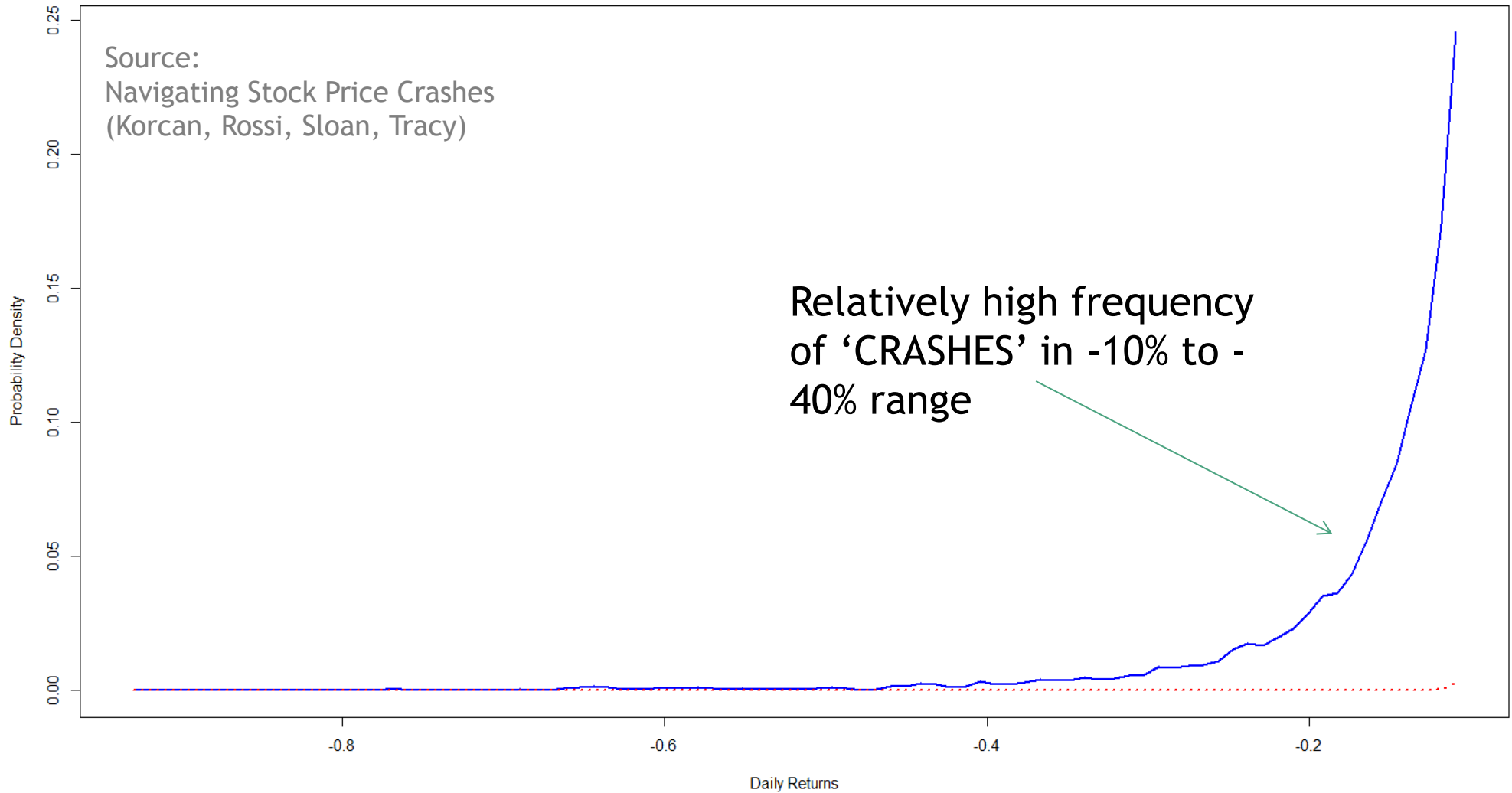
- Keurig Green Mountain shares crashed 26% in after-hours trading Wednesday after the company reduced its forecast for sales and announced plans for layoffs.
- In third-quarter earnings results, the maker of coffee brewers said it now expects a percentage fall in sales in the low- to mid-single digits this year.
- During the quarter, adjusted earnings per share came in at \$0.80, versus the forecast for \$0.78 according to Bloomberg. Sales missed forecasts, at \$969.5 million, versus \$1.04 billion forecast.
- The company also announced that it plans to reduce its workforce by 5%.
- CEO Brian Kelley said in the statement, "While we are not pleased with our revenue growth, we delivered earnings at the high end of our previous guidance."
- The company's newest machine, called the Keurig 2.0, failed to take off as expected. During the quarter, brewer and accessory net sales fell 26% compared to the prior year.

# Distribution of Daily Stock Returns





# Left Tail of Distribution



# Crashes are Costly to Active Managers

- Lower portfolio returns
- Higher portfolio return volatility
- Reputational effects for portfolio manager

## Objective on an Investment Process

- Identify the common causes of stock price crashes
- Build a model to help anticipate and avoid stock price crashes
- Document the gains to investment performance from positioning a portfolio to avoid stock price crashes

# Defining Stock Price Crashes

- “An unusually large and abrupt drop in the price of a stock”
- Measures of whether a stock’s price has crashed during any 6 month period:
  - minimum daily excess return of less than 20% (MINRET)
  - minimum daily excess return more than 8 standard deviations from zero (CRASH)
  - negative coefficient of skewness greater than 2 (NCSKEW)



# Events Causing Stock Price Crashes

Source: Navigating Stock Price Crashes (Korcan, Rossi, Sloan, Tracy)

Table 2  
Events Causing Stock Price Crashes from July 2012 to June 2014

CODE	EXPLANATION	Frequency	%
1	EARNINGS ANNOUNCEMENT	466	67.9
2	EARNINGS PREANNOUNCEMENT/UPDATED GUIDANCE	68	9.9
3	ADVERSE LEGAL RULING	11	1.6
4	ADVERSE REGULATORY RULING (E.G., FDA)	16	2.3
5	MANAGEMENT CHANGE	6	0.9
6	OTHER FIRM ANNOUNCEMENT	64	9.3
7	OTHER	40	5.8
8	NOT AVAILABLE	15	2.2

# Indicators of Stock Price Crashes

- Abnormally high stock volume
- High valuation ratios (e.g., market-to-book ratio)
- High level of ‘accounting opacity’ (earnings based on management estimates versus realized cash flows)
- High short interest
- High sell-side forecasts of sales growth

# Identifying High Crash Risk Stocks

- Rank stocks on each of the five measures identified in the previous slide
- Assign a 'crash flag' to stocks in the highest quintile (top 20%) on each measure
- Stocks with three or more flags are categorized as having high crash risk
- The remainder are classified as having low crash risk

# Abnormally High Level of Volume

Could signal:

- Insiders and sophisticated investors selling
- Shakey investor base willing to liquidate on bad news
- High level of disagreement among investors -- uncertainty

Measured as the monthly shares traded as a % of Shares Outstanding; and averaging the prior 6 months, minus the average of the 12 months prior (18 months of trading history)

# High valuation ratios (e.g., market-to-book ratio)

Could signal:

- Very high expectations
- Potential for large re-rating (decrease in valuations)

Measure as Book to Market values. (Inverse of P/B)



## High level of 'accounting opacity' (earnings based on management estimates versus realized cash flows)

Could signal:

- Use of aggressive accounting estimates

Measure as Net Income - Free Cash Flow as a % of Total Assets

# High Level of Short Interest

## Could signal:

- Sophisticated Investors have reason to take a bearish position, their research *may* be correct

## Measure as Short Interest as a % of Shares Outstanding

# High Sales Growth as estimated by Sell-Side Analysts

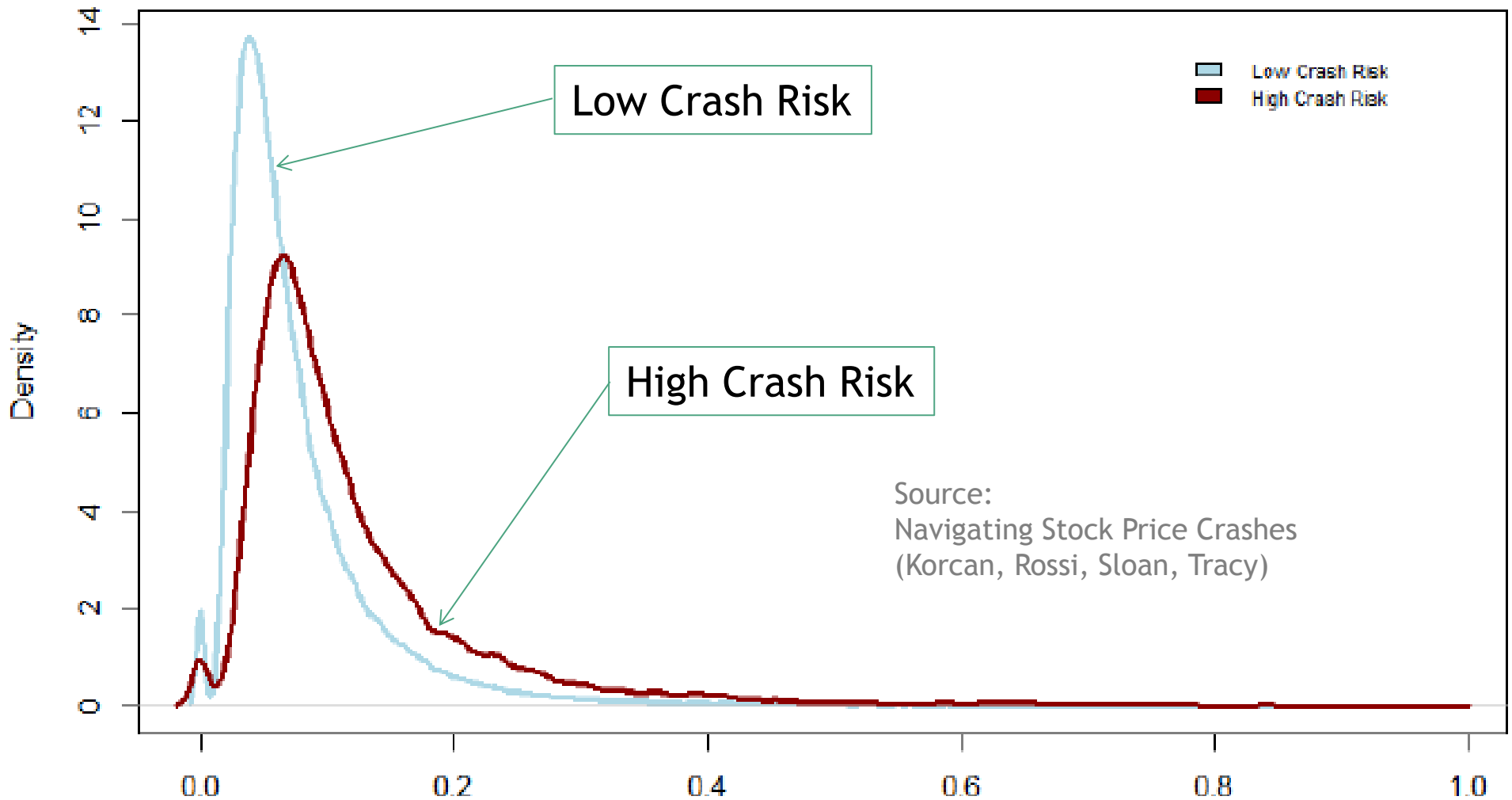
Could signal:

- High expectations that, if not met, could cause a stock correction

Measure as 2 year forward mean Sales estimate / 1 year forward mean Sales estimate

# Ability to Predict Stock Price Crashes

## Minimum Daily Return over the next 6 months



# Investment Performance of Stocks by Number of Crash Flags

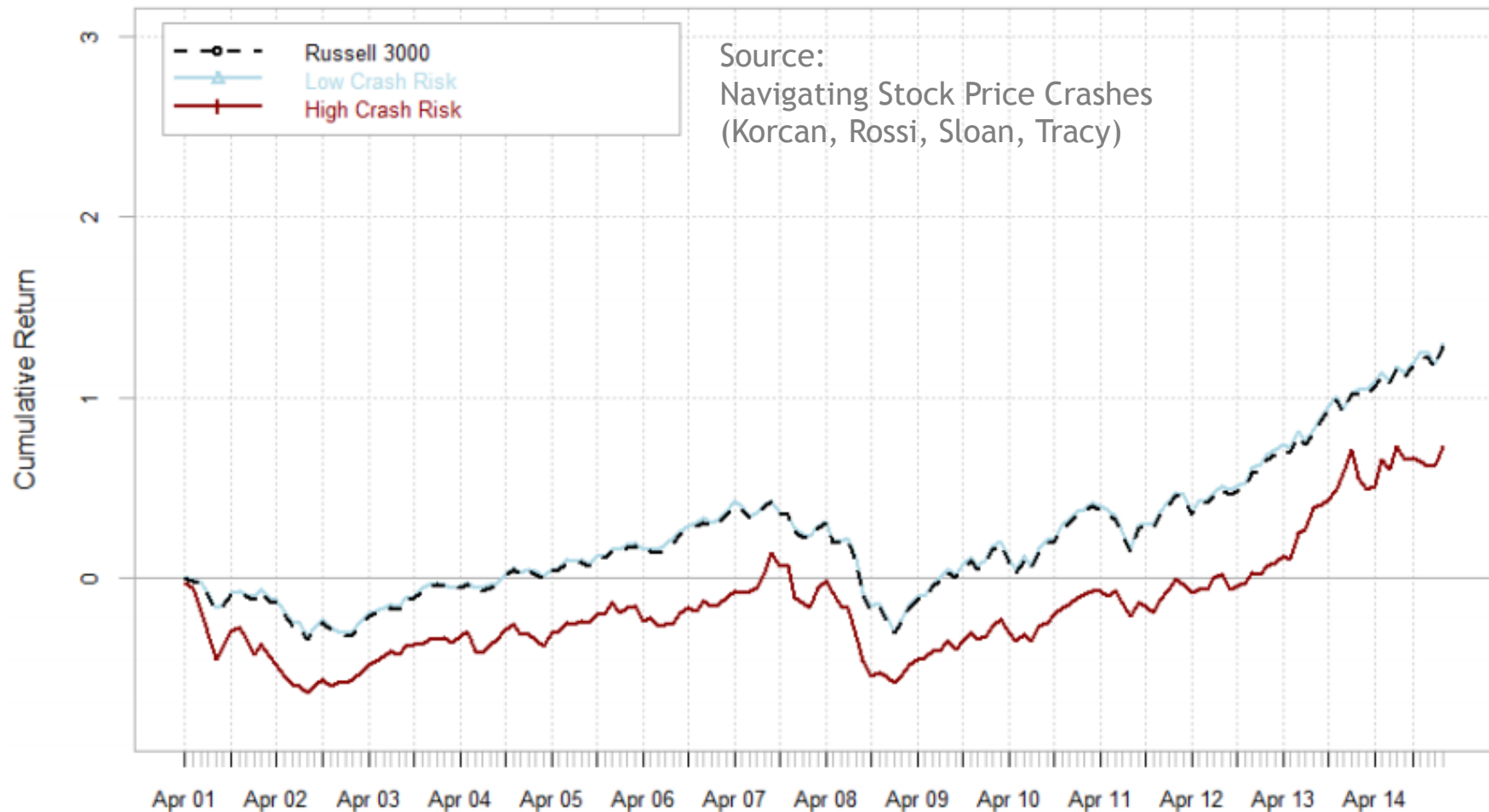
Source: Navigating Stock Price Crashes (Korcan, Rossi, Sloan, Tracy)

Number of Crash Flags	Mean Investment Performance Over the Next 6 Months					
	% of Observations	CRASH	NCSKEW	MINRET	Active Return Versus Russell 3000	Daily Tracking Error
0	45	3.54	-0.27	6.68%	1.15%	2.03%
1	30	3.62	-0.27	8.25%	0.89%	2.42%
2	15	3.71	-0.27	10.38%	-0.41%	2.97%
3	7	3.80	-0.23	11.92%	-2.43%	3.29%
4	2	3.86	-0.19	13.33 %	-4.66 %	3.57%
5	1	3.92	-0.02	14.42%	-6.00%	3.67%



# Cumulative Returns: Value Weighted

## Market Cap Weighted



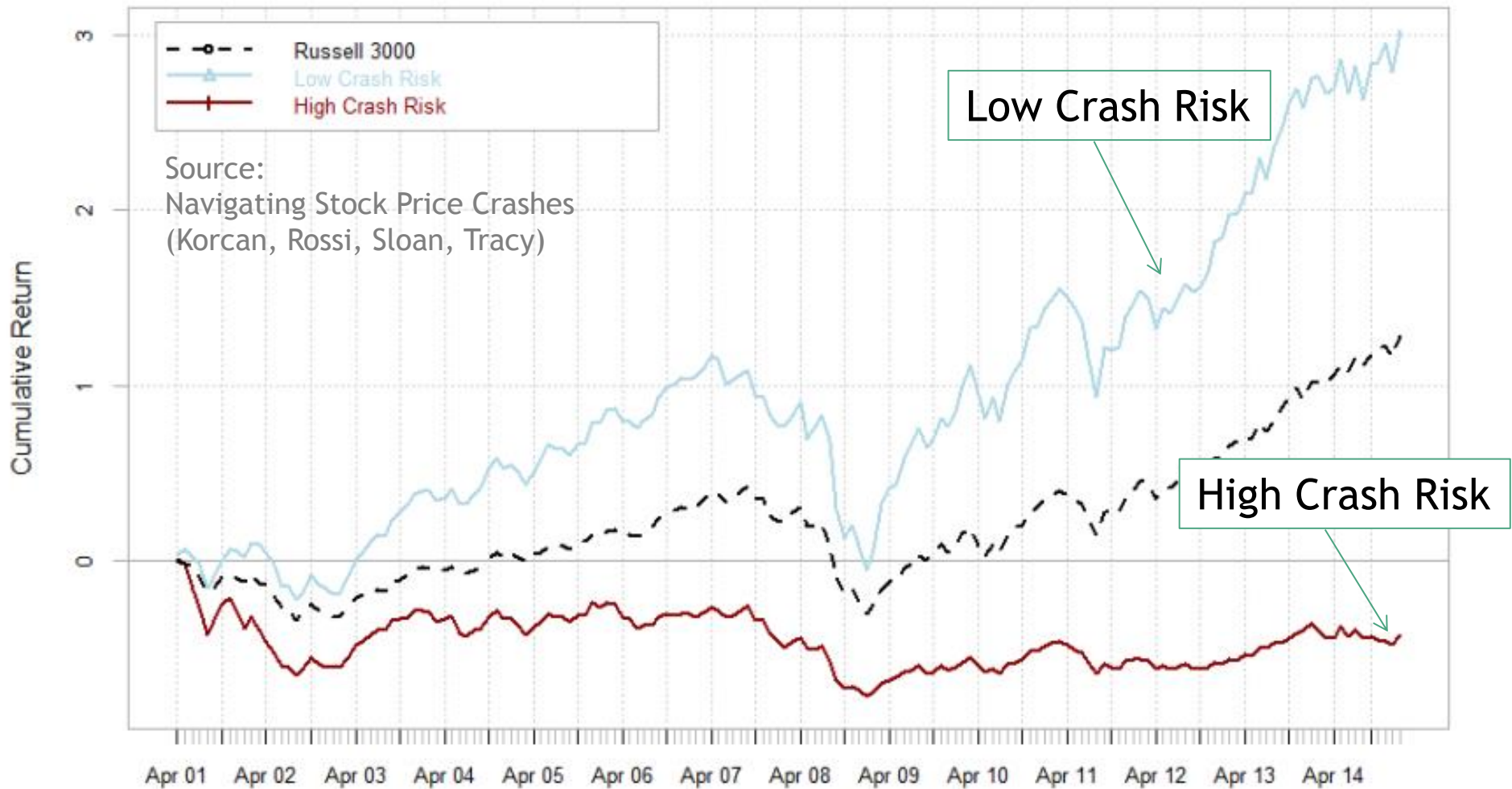
Cap-weighted indexes weight the constituents based upon their market capitalization; whereas, equal-weighted indexes give each constituent an equal weight in the index

Performance quoted represents past performance and does not guarantee future results. Indexes are unmanaged and not available for direct investment and do not represent the performance of a single fund or any of the RS Investments Funds.

Material discussed is meant for general illustration and/or informational purposes only and should not be construed as tax, legal or investment advice. Any discussion of specific securities should not be considered a recommendation to buy or sell those securities.

# Cumulative Returns: Equal Weighted

Equal Weighted



Source:  
Navigating Stock Price Crashes  
(Korcan, Rossi, Sloan, Tracy)

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# Investment Performance of High and Low Crash Risk Portfolios

Source: Navigating Stock Price Crashes (Korcan, Rossi, Sloan, Tracy)

	Russell 3000	Value-Weighted Portfolio		Equal-Weighted Portfolio	
		Low Crash Risk	High Crash Risk	Low Crash Risk	High Crash Risk
Excess Return	4.26%	4.33%	2.08%	8.61%	-5.98%
Volatility	15.40%	15.17%	24.62%	20.79%	27.29%
Sharpe Ratio	0.2764	0.2854	0.0847	0.4142	-0.2191
Versus Russell 3000:					
Beta		0.9840	1.3514	1.2643	1.5908
Active Return		0.07%	-2.19%	4.41%	-10.36%
Tracking Error		0.67%	14.22%	8.34%	15.07%
Information Ratio		0.1084	-0.1541	0.5291	-0.6876

# Conclusions and Implications

- Stock returns are characterized by relatively high frequency of large negative returns or ‘crashes’
- These crashes most frequently occur in response to accumulated bad news that is released in quarterly earnings announcement
- We identify 5 flags that are useful for forecasting crashes
- Each flag has an intuitive interpretation that provides the starting point for deeper fundamental analysis